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SCIENCE

FRIDAY, OCTOBER 5, 1888.

NOTWITHSTANDING THE EMPHATIC warnings of all experienced Arctic navigators, and the difficulties encountered on the 'Alert' expeditions, the projected route from England through Hudson Strait to Fort Churchill continues to be discussed in England and Canada; and quite recently the establishment of a line of steamers on this route was advocated by no less an authority than Commodore A. H. Markham, in a lecture delivered before the Royal Geographical Society. As he failed, however, to disprove any of the objections raised against the practicability of this route, which are chiefly founded on the always imminent danger of Fox Channel ice, his remarks fail to convince us. There is no doubt that powerful but small steamers can accomplish the journey annually with comparative safety, but this is far from being sufficient to make Hudson Strait a practicable trade-route. The premium on this route would have to be enormously high on account of the great number of dangers to navigation, and at all seasons the steamers would be liable to long delays. Sir Charles Tupper, who was present at this discussion, did not take as favorable a view as Markham, while Dr. Rae condemned the plan as wholly untenable. It seems somewhat surprising to see it again revived after its impracticability appeared to have been thoroughly proved by the results of the Canadian Hudson Bay expeditions.

A LESSON IN COMMERCIAL GEOGRAPHY.

SIR C. W. WILSON, in his presidential address to the geographical section of the British Association, dwelt upon the importance of commercial geography and its bearings upon the economic welfare of England. He gave a sketch of the history of the world's trade, and thus outlined one of the most important branches of commercial geography. His remarks on the value of this study, although referring to England, are well worth being remembered. "My object has been," he said, "to draw attention to the supreme importance to this country of the science of commercial geography. That science is not confined to a knowledge of the localities in which those products of the earth which have a commercial value are to be found, and of the markets in which they can be sold with the greatest profit. Its higher aims are to divine, by a combination of historical retrospect and scientific foresight, the channels through which commerce will flow in the future, and the points at which new centres of trade must arrive in obedience to known laws. A precise knowledge of the form, size, and geological structure of the globe; of its physical features; of the topographical distribution of its mineral and vegetable products, and of the varied forms of animal life, including man, that it sustains; of the influence of geographical environment on man and the lower animals; and of the climatic conditions of the various regions of the earth, — is absolutely essential to a successful solution of the many problems before us. If England is to maintain her commanding position in the world of commerce, she must approach these problems in the spirit of Henry the Navigator, and by high scientific training fit her sons to play their part like men in the coming struggle for commercial supremacy. The struggle will be keen, and victory will rest with those who have most fully realized the truth of the maxim that 'knowledge is power.'"

His lucid method of treating the questions of commercial geography will be seen from his interesting remarks on the Suez Canal, which are the more interesting, as they suggest a comparison to the effects of a canal through the American Isthmus.

"The opening of the Suez Canal, by diverting trade from the

Cape route to the Mediterranean, has produced, and is still producing, changes in the intercourse between the East and the West which affect this country more nearly, perhaps, than any other European state. The changes have been in three directions.

"First, An increasing proportion of the raw material and products of the East is carried direct to Mediterranean ports, by ships passing through the canal, instead of coming, as they once did, to England for distribution. Thus Odessa, Trieste, Venice, and Marseilles are becoming centres of distribution for Southern and Central Europe, as Antwerp and Hamburg are for the North; and our merchants are thus losing the profits they derived from transmitting and forwarding Eastern goods to Europe. It is true that the carrying-trade is still, to a very great extent, in English hands; but should this country be involved in a European war, the carrying-trade, unless we can efficiently protect it, will pass to others, and it will not readily return. Continental manufacturers have always been heavily handicapped by the position England has held since the commencement of the century, and the distributing trade would doubtless have passed from us in process of time. The opening of the canal has accelerated the change, to the detriment of English manufactures, and consequently of the national wealth; and it must tend to make England less and less each year the emporium of the world. We are experiencing the results of a natural law that a redistribution of the centres of trade must follow a re-arrangement of the channels of commerce.

"Second, The diversion of traffic from the Cape route has led to the construction of steamers for special trade to India and the East through the canal. On this line coaling stations are frequent, and the seas, excepting in the Bay of Biscay, are more tranquil than on most long voyages. The result is, that an inferior type of vessel, both as regards coal-stowage, speed, endurance, and seaworthiness, has been built. These 'canal wallahs,' as they are sometimes called, are quite unfitted for the voyage round the Cape, and, should the canal be blocked by war or accident, they would be practically useless in carrying on our Eastern trade. Since the canal has deepened, they have improved, for it has been found cheaper to have more coal-stowage, but they are still far from being available for the long voyage round the Cape. Had the canal not been made, a large number of fine steamers would gradually have been built for the Cape route, and, though the sailing-ships which formerly carried the India and China trade would have held their own longer, we should by this time have had more of the class of steamer that would be invaluable to us in war-time; and our trade would not have been liable, as it is now, to paralysis by the closing of the canal.

"Third, Sir William Hunter has pointed out, that, since the opening of the canal, India has entered the market as a competitor with the British workman; and that the development of that part of the empire as a manufacturing and food-exporting country will involve changes in English production which must for a time be attended by suffering and loss. Indian trade has advanced by rapid strides, the exports of merchandise have risen from an average of fifty-seven millions for the five years preceding 1874 to eighty-eight millions in 1884, and there has been an immense expansion in the export of bulky commodities. Wheat, which occupied an insignificant place in the list of exports, is now a great staple of Indian commerce, and the export has risen since 1873 from one and three-quarters to twenty-one million hundredweights. It is almost impossible to estimate the ultimate dimensions of the wheat trade, and it is only the forerunner of other trades in which India is destined to compete keenly with the English and European producers.

"The position in which England has been placed by the opening of the canal is in some respects similar to that of Venice after the discovery of the Cape route; but there is a wide difference in the

spirit with which the change in the commercial routes was accepted. Venice made no attempt to use the Cape route, and did all she could to prevent others from taking advantage of it: England, though by a natural instinct she opposed the construction of the canal, was one of the first to take advantage of it when opened, and, so far as the carrying-trade is concerned, she has hitherto successfully competed with other countries."

It is hardly possible to imagine what the effect of the American canal will be. Its influence is likely to be undervalued in Europe, as it will undoubtedly far more benefit the United States than European states. It will undoubtedly cause a revolution of the Eastern carrying-trade, and wrest from England's hand the profit obtained by distributing many Eastern goods over Europe and America.

The importance of geography, and more especially of commercial geography, has recently been emphasized by many English writers, and nowhere has this science more ably been advocated than in C. W. Wilson's address, from which we quoted above. If this science is important to England, it is even more important to us who have to develop the unknown resources of our vast territory. There can be no doubt that from an intelligent pursuit of this science great benefits would accrue to the welfare of our country.

THE LOCATION OF THE NICARAGUA SHIP-CANAL.

THE result of the surveys for the final location of the Nicaragua Canal, just completed by the Nicaragua Canal Construction Company, are highly satisfactory, and confirm with marked precision the great advantages, in both a financial and engineering point of view, claimed for the route recommended after the survey of 1885. Limited time and insufficient force for extensive field-work made a portion of that survey preliminary in its character; and, while the route selected was regarded as perfectly practicable, yet there were important details of construction and possibilities for improvements which could only be definitely settled by a more exhaustive examination of the newly traversed ground.

It has been the object of the last surveying expedition to eliminate all those doubtful elements, and to perfect the final plans for the work, from the Atlantic to the Pacific, before the scheme is finally presented to the public by the promoters of the enterprise.

The work accomplished is highly creditable to the Construction Company. No expense or personal efforts have been spared to bring out the whole truth; and the detailed drawings representing the entire route, the geological specimens, the results of many borings of the ground, and much other valuable information bearing on the subject, now in possession of the company, bear testimony to the sound and honest intention of the promoters of this great enterprise not to go before the public until they are fully prepared to answer all questions, and to show with unusual accuracy the probable cost of the entire work.

The recent surveys extended over the whole ground; and after discarding those routes, or portions of routes, possessing the least merit, the whole force of the expedition was concentrated on those two presenting the greatest facilities for the construction of the canal. The difference between these two routes was confined to that portion extending from Greytown to the dam at Ochoa, there being no difference of opinion as to the best location between this latter point and the Pacific. Two routes had been suggested from Ochoa to Greytown,—one, the result of the survey of 1885, and called the 'upper route' on account of its striking feature of extending the summit or lake level across the basin of the river San Francisco and the 'eastern divide' to within a short distance of Greytown; the other, or 'lower route,' the result of the survey of 1872-73, extending through the lower valleys, and in close proximity to the river San Juan, to the divergency of the stream San Juanillo, an outlet of the San Juan River, and thence by a direct line to Greytown. Both routes have been re-examined and located with the same care, and with that precision which seems to control the work of the company; and a careful comparison of the results obtained shows the superiority of the upper route.

As now finally adopted, the location does not differ in general direction, controlling features, or total length, from that of 1885; but the last, more minute surveys have established beyond a doubt

